Rivers and Streams Not Fully Supporting Uses

Table 7 lists streams and rivers which did not fully support warm water aquatic habitat (denoted as aquatic life) and primary contact recreation (denoted as recreation) uses. Stream miles affected and causes and sources of nonsupport are also listed.

Attainment of Clean Water Act Goals

The Clean Water Act sets a national goal that, wherever attainable, water quality should provide for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the nation's waters. These are often referred to as the fishable/swimmable goals of the Act. The data utilized to assess use support were evaluated in terms of the above goals. If warmwater aquatic habitat use was fully or partially supported, the fishable goal was assessed as fully or partially met. If a stream was not supporting the use, the fishable goal was not met. If the primary contact recreation use was supported or partially supported, then the swimmable goal was fully or partially met. If the use was not supported, the goal was not met. Table 8 summarizes the attainment of the fishable/swimmable goals for Kentucky's rivers and streams. The fishable goal was met in more of the assessed waters than the swimmable goal. The swimmable goal was not met in about 60 percent of the assessed waters. As pointed out in the previous discussion, fecal coliform pollution is the major cause of this goal not being achieved. There is a difference in miles assessed for these goals because more biological data was available to assess the fishable goal than was bacteriological data to assess the swimmable goal.

Table 8

Attainment of Clean Water Act Goals in Rivers and Streams

Goal Attainment	Fishable Goal	Swimmable Goal
Miles meeting	6,913.6	1,481.2
Miles partially meeting	1,701.8	575.9
Miles not meeting	722.9	1,537.6
Miles assesseed	9,338.3	3,594.7

Table 7
List of Streams Not Fully Supporting Uses by River Basin

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Big Sandy River Basin						
Tug Fork	26.0	Siltation	Mining	55.4	Pathogens	Municipal/Ag
Knox Creek				7.6	Pathogens	Agriculture
Big Creek	19.7	Siltation	Ag/Mining			
Russell Fork				6.0	Pathogens	Municipal/Ag
Elkhorn Creek				27.4	Pathogens	Municipal
Shelby Creek				10.0	Pathogens	Municipal
Levisa Fork	48.0	Siltation/Organic enrichment	Ag/Mining/ Municipal	48.0	Pathogens	Municipal/Ag
Mud Creek	17.0	Siltation/Organic enrichment	Ag/Mining			
Left Fk. Middle Ck.	5.3	pH	Mining	5.3	pH	Mining
Paint Creek				1.0	Pathogens	Urban runoff
Big Sandy River	26.8	Metals	Mining			
Blaine Creek	34.2	Chlorides	Petroleum activities			

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Little Sandy River Basin						
Little Sandy River				51.0	Pathogens	Municipal/ Ag/Septic tanks
East Fk. Little Sandy River	31.1	Siltation	Ag/Mining			
Newcomb Creek	12.0	Chlorides	Petroleum activities			
Tygarts Creek				45.5	Pathogens	Municipal
Licking River Basin						
North Fk. Licking River				19.5	Pathogens	Agriculture
Licking River	6.4	Chlorides/Organic enrichment	Petroleum activities/ Municipal	43.6	Pathogens	Municipal/Ag
Burning Fork	7.5	Chlorides	Petroleum activities			
Rockhouse Fork	3.0	Chlorides	Petroleum activities			
State Road Fork	5.1	Chlorides	Petroleum activities			

Table 7 (Continued)

Stream	Uses Not Supported					
	Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Lick Creek	9.2	Chlorides	Petroleum activities			
Raccoon Creek	5.2	Chlorides	Petroleum activities			
South Fk. Licking River	16.0	Nutrients/ SIltation	Ag/Urban runoff	20.0	Pathogens	Municipal/Ag/ Urban runoff
Hinkston Creek				19.8	Pathogens	Municipal/Ag
Indian Creek				0.6	Pathogens	Municipal
Big Brushy Fork	4.7	Chlorides/Nutrients	Agriculture			
Brushy Fork Creek	1.4	Chlorides/Nutrients	Industrial			
U.T. to Brushy Fork	2.8	Chlorides/Nutrients	Industrial			
Houston Creek				19.0	Pathogens	Agriculture
Hancock Creek				7.6	Pathogens	Agriculture
Strodes Creek				24.0	Pathogens	Municipal/Ag/ Urban runoff
Stoner Creek				9.6	Pathogens	Municipal/Ag

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Kentucky River Basin						
North Fk. Kentucky River	8.6	Siltation	Mining/Ag	46.1	Pathogens	Municipal/ Urban runoff
Lost Creek	18.5	Siltation	Mining			
Spring Fk. Quicksand Ck.	15.0	Siltation	Mining			
South Fk. Quicksand Ck.				13.8	Pathogens	Agriculture
Quicksand Creek				20.8	Pathogens	Agriculture
Troublesome Creek				49.5	Pathogens	Municipal/Septic tanks
Rockhouse Creek	24.3	Siltation	Mining			
Middle Fk. Kentucky River				43.2	Pathogens	Agriculture
Raccoon Creek	8.5	Oil & Grease/Siltation	Petroleum activities/ Mining			
Cutshin Creek	28.8	Oil & Grease/Siltation	Petroleum activities/ Mining			
Kentucky River (Heidelburg)				28.3	Pathogens	Municipal/Ag

Table 7 (Continued)

Stream	Uses Not Supported					
	Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Kentucky River (Camp Nelson)				37.7	Pathogens	Unknown
Kentucky River (Frankfort)				30.1	Pathogens	Unknown
Red River	34.3	Siltation/Metals	Habitat damage/ Mining	10.1	Pathogens	Municipal
South Fk. Red River	11.8	Chlorides	Petroleum activities			
Sand Lick Fork	5.0	Chlorides	Petroleum activities			
Billey Fork	8.6	Chlorides	Petroleum activities			
Millers Creek	6.4	Chlorides	Petroleum activities			
Big Sinking Creek	14.1	Chlorides	Petroleum activities			
North Elkhorn Creek	2.0	Organic enrichment/ Chlorine/Nutrients	Municipal			
Cane Run	17.4	Unknown toxicity	Unknown			
South Elkhorn Creek	41.0	Organic enrichment/ Metals	Municipal	17.6	Pathogens	Municipal/ Urban runoff

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Town Branch	11.3	Organic enrichment/ Metals	Municipal	11.3	Pathogens	Municipal
Dix River				13.5	Pathogens	Municipal
Clarks Run	8.0	Organic enrichment/ Unknown toxicity	Municipal			
Silver Creek	2.0	Organic enrichment/ Nutrients	Municipal			
Walnut Meadow Branch	3.6	Organic enrichment/ Nutrients	Municipal			
Brushy Fork	0.2	Nutrients	Municipal			
Upper Cumberland River Basin						
Poor Fork Cumberland River	47.0	Siltation	Mining			
Cumberland River				75.1	Pathogens	Municipal/ Urban runoff/ Unknown
Marsh Creek	9.2	Siltation	Mining			
Clear Fk. Yellow Creek	8.7	Siltation	Mining			

Table 7 (Continued)

Stream	Uses Not Supported					
	Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Stoney Fk. Yellow Creek	7.0	Siltation	Mining			
Bennetts Fk. Yellow Creek	6.3	Habitat damage/ Siltation	Mining			
Yellow Creek	5.5	Habitat damage/ Organic enrichment	Municipal/ Urban runoff			
Little Yellow Creek	2.5	Siltation	Construction			
Cranks Creek	13.3	Siltation/pH	Mining			
Crooked Creek	12.2	Siltation	Mining			
Cumberland River (Burkesville)				62.4	Pathogens	Unknown
Big Lily Creek	2.6	Chlorides	Industrial			
Elk Creek	1.5	Organic enrichment	Municipal			
Little South Fork	43.8	Siltation/Chlorides	Mining/Petroleum activities			
Rock Creek	4.0	Metals/pH	Mining	4.0	pH	Mining
Roaring Paunch Creek	15.6	Siltation/Chlorides	Mining/Petroleum activities			

Table 7 (Continued)

Stream	Uses Not Supported					
	Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Salt River Basin						
Salt River	48.3	Organic enrichment/ Metals/Nutrients	Municipal/Ag/ Urban runoff	13.9	Pathogens	Municipal/Ag Urban runoff
Mill Creek	13.5	Organic enrichment	Municipal	13.5	Pathogens	Municipal
Long Lick Creek	12.4	Organic enrichment	Municipal			
Knob Creek	15.3	Unknown toxicity/ Organic enrichment	Municipal			
Brier Creek	6.5	Unknown toxicity/ Organic enrichment	Municipal			
Fishpool Creek	5.4	Unknown toxicity/ Organic enrichment	Municipal	5.4	Pathogens	Municipal
Pond Creek	29.8	Unknown toxicity/ Organic enrichment	Municipal	29.8	Pathogens	Municipal
Blue Lick Creek	6.0	Organic enrichment	Municipal			
Brooks Run	6.9	Organic enrichment	Municipal	6.9	Pathogens	Municipal
Cedar Creek	15.6	Organic enrichment	Municipal	15.6	Pathogens	Municipal
Pennsylvania Run	3.0	Organic enrichment	Municipal	3.0	Pathogens	Municipal

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Chenoweth Run	9.1	Organic enirchment	Municipal	9.1	Pathogens	Municipal
Cane Run	7.6	Organic enrichment	Municipal			
Long Run	14.6	Organic enrichment	Municipal			
Currys Fork	5.0	Organic enrichment	Municipal			
North Fork Currys Fork	7.6	Organic enrichment	Municipal			
Floyds Fork	48.5	Organic enrichment	Municipal	61.7	Pathogens	Municipal
Rolling Fork	~~20.~~1	~~Organic enrichment~~	~~Municipal~~	10~~8.9~~	Pathogens	Unban runoff/ Municipal
Green River Basin						
Green River	55.0	Metals	Unknown	107.6	Pathogens	Agriculture/ Urban runoff
Valley Creek	17.5	Organic enrichment/ Chlorides	Municipal/Urban runoff			
Bacon Creek				31.2	Pathogens	Agriculture
Nolin River				27.5	Pathogens	Municipal
Little Pitman Creek	10.0	Chlorides/Unknown toxicity	Municipal/Ag			

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Barren River	14.2	Metals	Urban runoff			
Black Lick Creek	11.2	Organic enrichment	Industrial/Municipal			
West Fk. Drakes Creek	23.4	Priority organics	Industrial			
Drakes Creek	23.5	Priority organics	Industrial			
Caney Creek	7.1	pH/Metals	Mining	7.1	pH	Mining
Pond Creek	28.8	pH/Metals	Mining	28.8	pH	Mining
Mud River	64.7	Priority organics	Industrial	34.2	Pathogens	Municipal
Town Branch	6.7	Priority organics	Industrial			
Panther Creek	22.5	Habitat damage/ Siltation	Channelization/Ag			
North Fk. Panther Creek	9.0	Habitat damage/ Siltation	Channelization/Ag			
South Fk. Panther Creek	10.0	Habitat damage/ Siltation	Channelization/Ag			
Pond River	52.6	Siltation/pH/Metals Nutrients/Habitat damage	Petroleum activities/ Ag/Unknown			

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Flat Creek	10.6	pH	Mining	10.6	pH	Mining
Drakes Creek	21.3	pH	Mining	21.3	pH	Mining
Cypress Creek	33.3	pH	Mining	33.3	pH	Mining
Harris Creek	2.6	pH	Mining	2.6	pH	Mining
Tradewater River Basin						
Tradewater River	96.7	Organic enrichment/ Siltation/Metals	Mining/Ag			
Cypress Creek	10.0	pH/Siltation	Mining/Ag	10.0	pH	Mining
Smith Ditch	8.3	pH/Siltation	Mining/Ag	8.3	pH	Mining
Craborchard/Vaughn Ditch	18.8	pH/Siltation	Mining/Ag	18.8	pH	Mining
Clear Creek	28.1	pH/Siltation	Mining/Ag	28.1	pH	Mining
Buffalo Creek	7.8	pH/Siltation	Mining/Ag	7.8	pH	Mining
Cany Creek	11.3	pH/Siltation	Mining/Ag	1.3	pH	Mining
Lick Creek	18.1	pH/Siltation	Mining/Ag	18.1	pH	Mining
Weirs Creek	10.7	pH/Siltation	Mining/Ag	10.7	pH	Mining

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Lower Cumberland River Basin						
Little River	44.7	Siltation/Nutrients	Agriculture	37.4	Pathogens	Municipal
North Fk. Little River	15.9	Siltation/Nutrients	Ag/Municipal	14.0	Pathogens	Municipal/Ag
South Fk. Little River	25.4	Siltation/Nutrients	Ag/Industrial			
Sinking Fork Creek	35.5	Siltation/Nutrients	Agriculture			
Elk Fork Creek	7.0	Organic enrichment	Municipal/Ag			
Tennessee River Basin						
East Fk. Clarks River	21.5	Siltation/Nutrients/ Metals	Municipal/ Industrial/Ag	21.5	Pathogens	Municipal
Cypress Creek	19.5	Unknown toxicity/ Priority organics	Industrial			
Mississippi River Basin						
Mayfield Creek				31.8	Pathogens	Municipal/Ag
Bayou de Chien				21.8	Pathogens	Agriculture

Table 7 (Continued)

Stream	Uses Not Supported: Aquatic Life (miles)	Cause	Source	Recreation (miles)	Cause	Source
Ohio River Tributaries						
Harrods Creek	31.9	Organic enrichment	Municipal	31.9	Pathogens	Municipal
Little Goose Creek				8.7	Pathogens	Municipal
Goose Creek				12.1	Pathogens	Municipal
Muddy Fork				6.9	Pathogens	Municipal
Middle Fk. Beargrass Creek	2.5	Organic enrichment	Urban runoff	13.6	Pathogens	Urban runoff
South Fk. Beargrass Creek	15.0	Organic enrichment	Urban runoff	15.0	Pathogens	Urban runoff
Canoe Creek	14.8	Siltation/Habitat damage	Ag/Channelization			
Humphrey Creek	20.5	Siltation/Habitat damage	Agriculture			
Humphrey Branch	7.6	Unknown toxicity/ Siltation	Unknown/Ag			
Little Bayou Creek	6.5	Priority organics	Hazardous waste			

Trend Analysis

The Seasonal Kendall Trend Analysis technique was used for the analysis of time trend in seasonally varying water quality data from fixed, regularly sampled monitoring sites. This test is a non-parametric statistical analysis developed by the U.S. Geological Survey that analyzes the variation of data in each month over time. Concentrations of water quality constituents are often related to streamflow. In order to remove the effect of streamflow, flow adjustment procedures can be used. A time series of flow adjusted concentrations is developed, and that series is tested for trends. The flow adjusted concentration is defined as the actual concentration minus the expected concentration predicted from a discharge constituent regression equation.

Trends on flow-adjusted concentrations were determined at stations where the coefficient of determination (R^2) was greater than 0.5 and the regression was significant at the 95 percent probability level. If these conditions were not met, trend analysis was conducted on the raw data concentrations. For either the raw data or the flow adjusted data, the trend "p" level is the level of statistical significance of the Seasonal Kendall test. Values of "p" less than 0.05 are considered here to be significant and indicate a trend.

The methods described above were applied to the 45 stations in the DOW ambient monitoring network. The time frame for this analysis varies from station to station, depending on when station sampling was begun, or when a significant change in the basin occurred. In addition to these stations, the Ohio River Valley Water Sanitation Commission (ORSANCO) operates stations on the lower main stems of large rivers in Kentucky that flow into the Ohio River. ORSANCO has conducted trend analyses at their stations, using flow adjusted concentrations only. Results from DOW's and ORSANCO's analyses are presented in Appendix A, which also lists summary water quality statistics for the stations tested for trends.

The data in the appendix shows the variability of water quality and trends in Kentucky. Some parameters are increasing at various stations and decreasing at others. An effort to determine the magnitude of trends was not conducted for this report, but should be conducted as a follow-up to this analysis to further determine the relative importance of a reported trend. Several stations stand out for further review: the Nolin River at White Mills, the South Fork of Elkhorn Creek near Midway, Levisa Fork at Pikeville, and Clarks River at Almo. The Nolin River data indicates an increase in specific conductance, pH, chlorides, sulfate, total phosphorus, total recoverable zinc, BOD, and suspended solids. These increases may be the result of contributions from the City of Elizabethtown's wastewater treatment plant. The South Fork of Elkhorn Creek data are indicating increasing dissolved oxygen, and decreasing specific conductance, alkalinity, and total phosphorus. These improvements are attributed to increased treatment of wastewater at the City of Lexington's Town Branch wastewater treatment plant.

In addition to specific stations, some parameters exhibit trends statewide. Total phosphorus decreased at all stations in the Big Sandy and Cumberland River Basins, and at seven other stations statewide. It increased at three stations. The pH is increasing at many stations, and not decreasing at any. Total recoverable lead is decreasing at most stations in the Green River Basin, decreasing at ten stations in other basins, and increasing at three stations. Chloride is increasing in 14 stations statewide and decreasing in only one. Specific conductance is increasing in 12 stations and decreasing in three. Specific causes for these trends are not readily apparent.

Public Health/Aquatic Life Impacts: Toxics

The biological monitoring program focuses on the protection of aquatic life from toxics and conventional pollutants. However, one of the underlying themes of aquatic life protection is public health protection. The DOW has played an increasing role in public health protection through assessing the need for fish consumption advisories based on fish tissue contamination by toxic pollutants. In addition, the Division assisted EPA in a national study to determine the extent of dioxin, chlordane and PCB contamination in fish tissue. These are discussed below. An update of the preliminary list of waters impaired by toxic pollutants (the 304(l) waters) which was reported in the 1988 305(b) Report is also provided in this section.

Fish Consumption Advisories

Four individual fish consumption advisories are currently in effect within the Commonwealth of Kentucky. Two of these, Town Branch/Mud River and West Fork Drakes Creek, were discussed in the 1988 305b report and are still in place. Two new fish consumption advisories were issued in 1989 and involve Little Bayou Creek (McCracken County) and four locations on the Ohio River. All four advisories are briefly summarized in Table 9, and are discussed in detail below.

All of the advisories are based on contaminant residues exceeding the respective Federal Food and Drug Administration (FDA) action levels in edible portions (fillets). For each advisory, PCBs are a contaminant of concern; chlordane is also of concern at three of the Ohio River locations. In each case, the advisories were jointly agreed upon and issued by the Kentucky Natural Resources and Environmental Portection Cabinet (KNREPC), the Kentucky Department of Fish and Wildlife Resources (KDFWR), and the Cabinet for Human Resources (CHR).

Town Branch/Mud River. This advisory was discussed in the 1988 305b Report. Clean-up activities have been conducted on-site and at several off-site locations. Groundwater monitoring has been initiated and sediment clean-up in Town Branch is scheduled to begin in 1990. Fish-tissue monitoring will also be conducted during these clean-up activities.

West Fork Drakes Creek. This advisory was also included in the 1988 305b report. Fish-tissue monitoring has been continued and the PCB levels appear to be declining. Additional sampling was done during 1988 and the stream is scheduled to be sampled during 1990.

Little Bayou Creek. This stream was placed under a fish consumption advisory in April, 1989, after the DOW received and reviewed fish-tissue data from the Paducah Gaseous Diffusion Plant (PGDP). The plant is currently conducting on-site clean-up activities, monitoring effluent quality, and performing groundwater studies. Chemical, ecological, and fish-tissue evaluations have been conducted in Big and Little Bayou Creeks by the University of Kentucky. Fish samples collected from nearby ponds on the West Kentucky Wildlife Management Area and from Metropolis Lake generally do not indicate PCB contamination. Additional monitoring at the PGDP is scheduled during 1990.

The Ohio River. This advisory was based on fish-tissue samples collected and analyzed in cooperation with ORSANCO during 1987 and 1988 (Table 10). After reviewing the data from both years, Kentucky proceeded to issue a fish consumption advisory at four locations where PCBs and/or chlordane exceeded the respective

Table 9
Fish Consumption Advisory Summary

Stream	Pollutants	Source	Miles Covered	Date Established	Comments
Town Branch/Mud River (Logan, Butler, and Muhlenberg counties)	PCBs	Dye-casting plant	64.7	October 1985	Cleanup in progress; monitoring continues
West Fork Drakes Ck. (Simpson and Warren counties)	PCBs	Adhesive plant	46.8	April 1985	Monitoring continues; levels in fish appear to be declining
Little Bayou Ck. (McCracken County)	PCBs	Gaseous diffusion plant	5.0	April 1989	On-site clean-up in progress; monitoring continues; contamination appears limited to Little Bayou Creek
Ohio River Location					
Mill Creek (RM 472.8)	PCBs Chlordane	Urban runoff; no known point source discharge		June 1989	Catfish and white bass listed; monitoring continues; revised in 1990 to cover entire Ohio River
McAlpine Lock and Dam (RM 606.8)	PCBs Chlordane	Urban runoff; no known point source discharge		June 1989	Catfish listed; monitoring continues
West Point (RM 625.9)	PCBs Chlordane	Urban runoff; no known point source discharge		June 1989	Catfish, carp, white bass listed; monitoring continues
Smithland (RM 918.5)	PCBs	Urban runoff; no known point source discharge		June 1989	Catfish listed; monitoring continues

FDA action levels (2.0 and 0.3 ppm respectively); only the species which exceeded FDA action levels were listed in the advisory. The advisory was interpreted by ORSANCO to include the entire pool in which the sampling site was located.

Based on 1989 ORSANCO data (Table 10), the advisory was amended to cover Kentucky's portion of the Ohio River. Follow-up sampling at the sites of concern was recommended to be included in ORSANCO's 1990 sampling schedule.

National Bioaccumulation Study

Eleven locations in Kentucky have been sampled as part of the National Dioxin Study and the National Bioaccumulation Study conducted by U.S. EPA. The Division of Water participated in these studies by providing information on sampling locations and by collecting fish samples for analysis by U.S. EPA/Region IV. Samples representing nine species have been collected and analyzed during these studies. Three major contaminants have been found: chlordane, dioxin, and PCBs (Table 11).

Data from these studies indicated two areas where FDA action levels were exceeded in fillet samples: the Ohio River at West Point and the Mud River at Cooperstown. Both of these areas are currently under a fish consumption advisory.

Only one sample collected by Kentucky during these studies has approached the FDA action level for dioxin (25 ppt). A 1989 composite fillet sample taken from two striped bass collected in the Big Sandy River near Catlettsburg, Kentucky was analyzed by U.S. EPA/Region IV and found to contain 22.8 ppt dioxin (Table 11). As a result, follow-up fish and sediment sampling will be conducted in this area. Currently, no fish consumption advisory has been issued.

Table 10
PCB and Chlordane Concentrations in ORSANCO Fish Samples, 1987-1989
(ppm)

Location	Species	PCBs			Chlordane		
		1987	1988	1989	1987	1988	1989
Greenup	Carp	0.47	NS	NS	0.07	NS	NS
	Channel Catfish	0.37	NS	NS	0.07	NS	NS
	Walleye	ND	NS	NS	ND	NS	NS
Meldahl	Carp	<0.1	0.51		0.02	<0.05	
	Smallmouth Buffalo			0.60			<0.10
	Channel Catfish	0.18	0.20		0.03	0.16	
	White Bass		0.65			<0.05	
	Bass	0.13			ND		
Licking River at Covington	Carp	ND	NS	NS	ND	NS	NS
	Channel Catfish	ND	NS	NS	ND	NS	NS
	Largemouth Bass	ND	NS	NS	ND	NS	NS

Table 10 (Continued)

Location	Species	PCBs 1987	PCBs 1988	PCBs 1989	Chlordane 1987	Chlordane 1988	Chlordane 1989
Mill Creek	Carp	ND		NS	ND		NS
	Channel Catfish	2.76*	2.54*	NS	0.30*	0.28	NS
	White Bass	3.24*	0.77	NS	0.16	0.05	NS
Markland	Carp	0.17	NS	NS	0.01	NS	NS
	Channel Catfish	0.74	NS	NS	0.12	NS	NS
	White Bass		NS	NS		NS	NS
	Crappie/Bass	0.57	NS	NS	0.02	NS	NS
McAlpine	Carp	0.74			0.24		
	Channel Catfish	ND	4.60*	2.63*	ND	0.60*	0.43*
	Smallmouth Buffalo			0.17			<0.10
	White Bass						
	White Crappie			<0.05	<0.10		
	Freshwater Drum			0.62			<0.10
	Carp/Bass/Sauger	0.08			0.01		
West Point	Carp	0.27	2.35*	NS	0.76*	0.35*	NS
	Channel Catfish	2.76*	0.64	NS	0.88*	0.10	NS
	White Bass	2.20*		NS	0.12		NS
	Black Bass		0.06	NS		<0.05	NS
Cannelton	Carp	0.18	NS	0.13	0.08	NS	<0.10
	Channel Catfish	0.92	NS	1.65	0.18	NS	0.21
	White Crappie		NS	<0.05		NS	<0.10
	Walleye/Sauger	<0.1	NS		ND	NS	
Newburgh	Carp	ND	NS		ND	NS	
	Channel Catfish	0.27	NS	1.66	0.07	NS	0.32*
	Smallmouth Buffalo		NS	0.60		NS	<0.10
	White Bass		NS	0.23		NS	<0.10
	Crappie	0.10	NS		ND	NS	
Green River at Seabree	Carp	0.13	NS	NS	ND	NS	NS
	Channel Catfish	0.13	NS	NS	ND	NS	NS
	White & Smallmouth Bass	ND	NS	NS	ND	NS	NS
Uniontown	Carp	0.19	NS	NS	0.04	NS	NS
	Channel Catfish	ND	NS	NS	ND	NS	NS
	Crappie	ND	NS	NS	ND	NS	NS
Smithland	Carp	0.45	NS	1.66	0.07	NS	<0.10
	Channel Catfish	2.48*	NS	0.43	0.21	NS	<0.10
	Blue Catfish		NS	0.23		NS	<0.10
	Bigmouth Buffalo		NS	0.21		NS	<0.10
	Smallmouth Bass	1.03	NS		ND	NS	

NS = Not Sampled, ND = Not Detected, * = Exceeds FDA Action Level

Table 11
National Bioaccumulation Study Results
(Dioxin, Chlordane, PCBs) for Kentucky

Site	Dioxins (ppt) 2,3,7,8 TCDD	2,3,7,8 TCDF	TEC	Chlordane (ppm)	PCBs (ppm)	% Lipid
Big Sandy River						
Catlettsburg (1987)						
Carp (WB; n=5)	4.38	3.05	5.72	0.215	1.218	7.0
Sauger (F; n=4)	0.67	ND	0.67	0.0046	0.094	0.6
Catlettsburg (1989)						
Carp (WB; n=3)	3.22	1.42	4.47	-	-	7.5
Carp duplicate	2.26	1.38	3.64	-	-	7.8
Carpsucker (WB; n=3)	1.90	0.68	1.97	0.0702	0.504	2.8
Carpsucker duplicate	-	-	-	0.0729	0.529	2.9
Striped Bass (F; n=2)	21.55	3.62	22.8	0.0733	0.741	1.2
Ohio River						
Cannelton (1984)						
Carpsucker (WB; n=1)	-	-	3.9	0.426	1.777	8.8
Carpsucker (F; n=2)	-	-	ND	-	-	-
Sauger (WB; n=2)	-	-	4.1	-	-	-
Sauger (F; n=1)	-	-	ND	-	-	-
Markland (1985)						
Carp (WB; n=2)	-	-	13.0	-	-	-
Carp (F)	-	-	6.4	-	-	-
Largemouth Bass (WB; n=5)	-	-	4.2	-	-	2.5
Largemouth Bass (F)	-	-	ND	-	-	2.5
Uniontown (1984)*						
Bottom feeder (WB)	-	-	3.4	-	-	-
Predator (WB)	-	-	ND	-	-	-
West Point (1984)*						
Bottom feeder (WB)	-	-	5.2	-	-	-
Predator (WB)	-	-	2.1	-	-	-
West Point (1987)						
Carp (WB; n=3)	4.38	3.23	7.37	0.403	1.366	7.2
Largemouth Bass (F; n=5)	ND	ND	0.00	-	-	2.5

Table 11 (Continued)

Site	Dioxins (ppt) 2,3,7,8 TCDD	2,3,7,8 TCDF	TEC	Chlordane (ppm)	PCBs (ppm)	% Lipid
Cave Run Lake						
1984						
Carp (WB; n=3)	-	-	ND	-	-	-
Kentucky River						
Gest (1985)						
Carp (WB; n=2)	-	-	0.8	-	-	-
Largemouth Bass (WB; n=2)	-	-	ND	-	-	-
Largemouth Bass (F; n=5)	-	-	ND	-	-	-
Mud River						
Cooperstown (1987)						
Carp (WB; n=3)	ND	23.53	3.16	0.195	24.12	7.4
Rock Bass (F; n=5)	ND	8.63	0.88	0.0052	0.780	1.1
Green River						
Beech Grove (1984)						
Carp (WB; n=4)	-	-	ND	-	-	-
Kentucky Lake						
1984						
Carp (WB; n=5)	-	-	ND	-	-	-
Mississippi River						
Wickliffe (1988)						
Carp (WB; n=4)	4.75	6.46	6.79	0.124	0.757	7.4
Carp duplicate	4.48	6.79	6.55	-	-	7.3
White Bass (F; n=7)	1.42	2.91	1.98	-	-	1.9

WB = Wholebody, F = fillet, ND = nondetected, TEC = toxicity equivalent concentration, n = number of fish analyzed
*Information obtained from U.S. EPA. 1987. The National Dioxin Study: Tiers 3,5,6 and 7. EPA 440/4-87-003. U.S. EPA, Washington, D.C. 20460.

Section 304(l) Waters

Section 304(l) of the 1987 Clean Water Act amendments required states to list waters impaired by: 1) point source discharges of toxic (priority or 307(a)) pollutants; 2) point and/or nonpoint (or unknown) sources of toxic pollutants causing violations of state numeric water quality standards; and 3) conventional or nonconventional pollutants from any source. These three lists have been commonly referred to as the short, mini, and long lists, respectively. As the intent of 304(l) was primarily to identify streams with toxic pollutant problems from point sources, the short list was the focus of the effort.

Kentucky presented the methodology and preliminary 304(l) lists in its 1988 305(b) report. Following several more months of data collection and evaluation, the final State lists (including seven industrial and 14 municipal facilities, two Superfund sites, and one U.S. Department of Energy facility on the short list) were submitted to EPA on February 4, 1989. This list differed from the preliminary short list in that three municipalities and nine industrial facilities were deleted because more recent data indicated that the water quality problem had been resolved due to more effective controls, or a facility no longer had an active point source discharge. Examples of the latter case included facility closure, product line changes, or routing of process wastewater to a municipal sewer system. For those facilities on the State's "final" short list, individual control strategies (ICS), consisting of adequate KPDES permits, were already finalized or drafted for all but seven municipalities. (If the states refused to issue revised permits by objecting to either the listing itself or the permit conditions, EPA was prepared to issue the permit).

EPA approved the majority of Kentucky's final lists on June 4, 1989, but disapproved those six municipalities for which permits did not yet contain biomonitoring requirements to control toxicity. However, it was understood that Kentucky would have these permits in draft form by June 4, 1990, in final form by February 4, 1991, and that the facilities would be in compliance by June 4, 1993. The approved ICSs for the other 17 facilities were required to be final as of February 4, 1990, and these facilities must comply with their permits by June 4, 1992. EPA also determined on June 4 that two bleached-kraft paper mills should be short-listed for dioxin.

EPA then weighed existing and new information and solicited public comment. Based on these deliberations, final lists, pollutant loadings, and ICS statuses were published on February 4, 1990. These lists differed from the final State lists submitted a year earlier in the following areas: 1) the City of Danville was deleted from the short list; 2) the two Superfund sites, Maxey Flats low-level radioactive waste disposal facility and Smith Farm landfill, were given deferred decisions due largely to the difficulty in defining them as point sources; and 3) two stream segments, Muddy Creek (a tributary to Rough River) and the Upper Green River, were added to the long list as a result of information contained in the SARAH Title III data submissions by the regulated community. The two bleached-kraft paper mills which EPA had proposed placing on the short list on June 2, 1989 were not included on the final short list because of data made available to EPA during the comment period. These data showed that: 1) dioxin levels in the effluents were not sufficient to cause instream problems due to the large dilution flows in the Ohio River and Mississippi River; and 2) dioxin levels found in fish flesh were not significantly higher downstream of the paper mills than upstream of the mills. The final mini and short lists (Tables 12 and 13) are provided in this report to update the preliminary lists presented in the 1988 305(b) Report. The ICS strategies approved as of June 2, 1989 are provided in Table 14 and the statuses of the disapproved ICS's are provided in Table 15. The long list can be found in the 1988 305(b) Report.

Table 12
304(l)(A)(i) or Mini List

Waterbody	Reach Number	Toxics
Licking River	05100101	Zinc
Stoner Creek	05100102	Zinc
South Fork Licking River	05100102	Metals
North Fork Kentucky River	05100201	Zinc
Red River	05100204	Zinc
Town Br. & S. Elkhorn Cr.	05100205	Zinc
Valley Creek	05110001	Cadmium Zinc
West Fork and Drakes Creek	05110002	PCBs
Town Br. and Mud River	05110003	PCBs
Unnamed tributary and East Fork Lynn Camp Creek	05130101	Zinc
Cumberland River	05130101	Zinc
Unnamed tributary and South Fork Little River	05130205	Zinc
Little River	05130205	Zinc
Cumberland River	05130205	Zinc
Chenoweth Run	05140102	Zinc
Pond Creek	05140102	Zinc, Cadmium Chromium
Salt River	05140102	Zinc
Bayou Creek/Little Bayou Creek	05140206	PCBs
E. Fork Clarks River	06040006	Zinc
Mayfield Creek	08010201	Zinc

Table 13
304(l)(B) and (C) or Short List

Point Source Name	Waterbody	Reach Number	Pollutant(s)	Amount to Be Controlled (lb/day)
Paris STP	Stoner Creek	05100102	Lead	0.51
Lexington (Town Br.) STP	Town Br. & S. Elkhorn Cr.	05100205	Lead Copper	1.73 3.37
North American Phillips Lighting	Unnamed trib. & Clarks Run	05100205	Lead	0.03
Eminence STP	Fox Run	05140102	Copper	0.54
Magnet Wire Co.	Ash Run	05140101	Copper	0.12
Cardinal Aluminum	Pond Creek (N. Ditch)	05140102	Copper Silver	0.26 0.04
Cardinal Extrusions	Spring Ditch & Pond Creek	05140102	Copper Silver	0.01 0.002
Campbellsville STP	Little Pitman Cr.	05140102	Copper Lead	2.40 0.48
Elizabethtown STP	Valley Creek	05110001	Cadmium Zinc	0.79 8.79
Horse Cave STP	Hidden River (underground to Green River)	05110001	Copper Silver	0.38 0.13
Madisonville STP	Unnamed trib. & Flat Creek	05110006	Lead	0.47
Corbin STP	Lynn Camp Creek	05130001	Copper	0.85
National Standard Co.	Unnamed trib. & East Fork Lynn Camp Creek	05130205	Zinc	0.14
Russell Co. STP	Big Lily Cr.	05130103	Copper	1.12
Pop Fasteners	Unnamed trib. & South Fork Little River	05130205	Zinc	0.02
Hopkinsville Northside STP	North Fork Little River	05130205	Copper	0.56

Table 13 (Continued)

Point Source Name	Waterbody	Reach Number	Pollutant(s)	Amount to Be Controlled (lb/day)
Hopkinsville Hammond-Wood STP	North Fork Little River	05130205	Copper	0.66
Jeffersontown STP	Chenoweth Run	05140102	Zinc	6.71
Marion STP	Rush Creek	05140102	Copper	1.13
Paducah Gaseous Diffusion Plant (U.S. Dept. of Energy)	Bayou Creek/ Little Bayou Creek	05140206	PCBs	4.6 ug/l*
B.F. Goodrich	Tennessee River	06040006	1,2-Dichloro-ethane	12.27

*ug/l = micrograms/liter = 10^{-6} grams/liter

Table 14
Individual Control Strategies
Approved as of June 2, 1989

Point Source	Waterbody	KPDES Permit No.	ICS Status
Paris STP	Stoner Creek	KY0021059	Final permit issued; acceptable ICS
Lexington (Town Br.)	Town Br. & S. Elkhorn Cr.	KY0021491	Final permit issued; acceptable ICS
North American Phillips Lighting	Unnamed trib. & Clarks Run	KY0002607	Draft permit; if permit is issued by 2/4/90 as drafted, the ICS would be acceptable
Eminence STP	Fox Run	KY0026883	Final permit issued; acceptable ICS

Table 14 (Continued)

Point Source	Waterbody	KPDES Permit No.	ICS Status
Magnet Wire Co.	Ash Run	KY0002208	Final permit issued; acceptable ICS
Cardinal Aluminum	Pond Creek	KY0071978	Final permit issued; acceptable ICS
Cardinal Extrusions	Spring Ditch & Pond Creek	KY0034835	Final permit issued; acceptable ICS
Horse Cave STP	Hidden River (underground to Green River)	KY0041092	Final permit issued; acceptable ICS
National Standard Co.	Unnamed trib. & East Fork Lynn Camp Creek	KY0003778	Final permit issued; acceptable ICS
Russell Co. STP	Big Lily Creek	KY0062995	Final permit issued; acceptable ICS
Pop Fasteners	Unnamed trib. & South Fork Little River	KY0003786	Final permit issued; acceptable ICS
Hopkinsville Hammond-Wood STP	North Fork Little River	KY0066532	Final permit issued; acceptable ICS
Marion STP	Rush Creek	KY0020661	Final permit issued; acceptable ICS
Paducah Gaseous Diffusion Plant (U.S. Dept. of Energy)	Bayou Creek/ Little Bayou	KY0004049	Final permit issued; acceptable ICS
B.F. Goodrich	Tennessee River	KY0003484	Final permit issued; acceptable ICS